DOCUMENT RESUME

ED 347 675 EA 024 122

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TITLE What Do We Know about School Size? What Should We Know?
PUB DATE 22 Apr 92
NOTE 21p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 20-24, 1992).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; Grade 12; High Schools; High School Seniors; *Influences; *Outcomes of Education; *School District Reorganization; *School Size; *Small Schools; Student Attitudes; Student Participation

ABSTRACT

For over 3 decades, American public secondary schools have become progressively larger. High school seniors once typically attended a school of 400 or fewer students; the majority of today's seniors graduate from a school with over 500 students. Although a 1964 Kansas study showed that small schools are superior to larger ones, James Conant's 1967 study extolling the virtues of comprehensive or larger schools (over 750 students) supported the notion of school consolidation and larger school size Recent research has found smaller elementary schools beneficial to student achievement, but school size research at the secondary level has been virtually overlooked. This review examines the effects of secondary-school size upon student outcomes. After outlining the current numbers and sizes of high schools, the paper examines outcomes such as student attitudes, achievement, voluntary participation, and the enduring effects of education. The paper also examines school-size effects upon curriculum, but omits the rural school consolidation, optimum school size, and optimum per-pupil expenditure literature. Conant advocates will be disappointed by the findings. Monk and Haller found that curricular adequacy was reached at a small high school level (that is, a graduating class of 100). Large secondary schools with a graduating class above 750 appear to have deleterious effects on student attitudes, achievement, and voluntary participation. (39 references) (MLH)

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What Do We Know About School Size?- What Should We Know ?

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A paper

presented to the

American Educational Research Association

Annual Meeting in San Francisco, California

April 22, 1992

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Abstract

For the last thirty-some years, American public secondary schools have become progressively larger. Whereas once the common experience of seniors was to be in a school of 400 or fewer students, the majority of today's seniors graduate from a school with an enrollment of 500 or more. This change would suggest that educational researchers have found that larger schools convey beneficial effects upon students. In fact, they have found precisely the opposite. This paper reviews empirical studies regarding student outcomes in attitude, achievement, and voluntary participation that demonstrate school size effects, and explores why this paradox exists.

The Issue of School Size

The issue of the beneficial effects of school size appears in microcosm in two books regarding secondary school size, each written within a few years of each other, and each arguing for opposing policies. The first appeared in 1964 (Barker and Gump, 1964), comparing eastern Kansas high school students who were juniors in four schools of 83 to 151 students with those in a high school of 2,287 students. Examining student participation in school activities, student satisfaction, number of classes taken, and community employment and participation in social organizations (but not student achievement), Barker and Gump concluded that small schools are superior to large schools on all the attributes they examined.

Three years later, in a study funded by the National Association of Secondary School Principals and the Carnegie Corporation, James Bryant Conant, then the president of Harvard, examined questionnaires from 2,024 schools of medium size (enrollments of 750-1,999) with approximately one-third of the students in the United States (Conant, 1967). Conant specifically omitted schools from which either less than 25 percent or more than 75 percent of the graduates attend college, estimating that this procedure only omitted 24 percent of the public high schools with a 12th grade, and schools with an enrollment over 2,000 (pp. 9-11). The response rate was about one-third. Although Conant found that size affected only the school's ability to offer a wide program of foreign languages, and its ability to offer advance placement classes, he concludes that larger is superior. Conant defined comprehensive schools "as comprising schools of medium size (enrollment between 750 and 2,000)" (p. 11). McGuire (1989) notes that the notion of the comprehensive school, as a result of Conant's belief, was that "larger schools (i.e., over 750 students) can offer more comprehensive instructional programs of greater quality at lower costs than smaller schools".

Although both arguments would be found curiously wanting by today's standards for quantitative research and statistical rigor, they were persuasive and well-received by the education community. Despite many caveats by Conant, it was clear that he favored school consolidation, in order to achieve the staff ratios necessary for a comprehensive school. Barker and Gump just as clearly extolled the affective virtues of small schools. Regardless of which camp may have made the most successful argument, the next approximately thirty years brought a great diminution to the numbers of small schools, while raising the average size of schools.

Today, the issue of school size effects at the elementary school level seems conclusive, based upon the number of studies and the general agreement of the findings (Fowler and Walberg, 1991). Kiesling (1967) found a negative relationship between math and verbal ability tests and elementary school size, which ranged from 200 to 4,000 students, even controlling for socio-economic differences. In a study of 110 elementary schools with enrollments of 139 to 1,710, Michelson (1972) found larger elementary schools

detrimental to student achievement, despite holding constant student income differences. Summers and Wolfe (1976) studied 627 elementary school students in Philadelphia, Pennsylvania public schools, and found that although achievement was largely determined by socioeconomic background, smaller elementary schools particularly benefitted black students' achievement. Controlling for student socioeconomic status, Wendling and Cohen (1981) found third-grade reading and mathematics achievement to be negatively related to school size. In a study using 287 elementary schools, Eberts, Kehoe, and Stone (1984) found higher student achievement in smaller schools. Miller, Ellsworth and Howell (1986) examined 12 schools where student reading achievement was higher than expected, controlling for student family background with 12 schools where achievement was lower. They found that the highly achieving schools were significantly smaller than the poorly achieving schools. In a study using data from 4,337 California K-6 elementary schools, Plecki (1991) examined both school size and urbanicity, and concludes that there is no support for the notion that larger schools are associated with improved student performance, and that a negative relationship between school size and student performance is most prevalent in urban schools. These studies span almost twenty years, each contains large numbers of public elementary schools in statistical analyses, all make some allowance for the effects of student background on the measured outcomes, all employ sophisticated statistical techniques and quantitative measures, and all reach similar conclusions, despite examining a variety of student outcomes

In comparison to the number and breath of studies on the elementary level, particularly regarding cognitive outcomes, research on the effects of school size at the public secondary school level has been virtually overlooked, except by advocates of rural education, where, presumably, they wish to prevail against the sea tide of school consolidation that has occurred since Conant's persuasive arguments. Morgan and Alwin (1980) comment that

> Even though the study of school effects has been a major sociological enterprise over the past two decades (Jencks, et al., 1972:151), empirical analyses tend to slight structural variables such as size in favor of measures of student body composition (e.g., Alexander & Eckland, 1975; Hauser, Sewell & Alwin, 1976; Alwin & Otto, 1977). The analogy of size occurs in this literature (see Davis, 1966), but variations in school size have not been explicitly incorporated into the research on school effects. A sizeable non-sociological literature exists, however, dealing primarily with issues of rural school consolidation, optimum student to teacher ratios, and optimum per pupil expenditures (see Educational Research Service, 1974) (footnote, pp. 241-242).

This review seeks to examine evidence of the effects of secondary school size upon student outcomes. It begins by examining the current numbers and sizes of high schools, and then examines student outcomes, such as student attitudes, achievement, voluntary participation, and the enduring effects of education. The paper also examines school size effects upon curricular offerings. The paper purposely omits the rural school consolidation, optimum school size and optimum per pupil expenditure literature as available in other reviews (see Educational Research Service, 1992, forthcoming).

One small caveat should be noted. As presently composed, the literature review omits some ten articles from the journal Research in Rural Education, and other journals not routinely held in most education libraries, which the author was unable to obtain even through inter-library loan, despite attempts over a three-month period. The sources obtained below came from computer searches of ERIC, Social Science Citation Index, and the Reader's Guide to Periodical Literature, from 1971 to the present, and were selected from those searches based upon the author's critical acceptance. Although Dissertation Abstracts was also subjected to a computer search, the requests for examination copies of selected dissertations had not yet borne fruit.

The Sizes and Characteristics of Secondary Schools

The historical trend toward ever larger organizational units for schooling has been described by Guthrie (1979) as a result of arguments for economic efficiency, fiscal equity, and the provision of enhanced educational benefits for students.

> ...the number of schools decreased from approximately 262,000 to 91,000 over the same period, [1930 to 1972] an approximate threefold reduction. The overwhelming proportion of the decrease in schools is accounted for by the elimination of one-teacher schools (Guthrie, 1979:18).

Mean school size increased fivefold, from less than 100 students to 550, and the average secondary school increased to 1,000 students. Consolidation was seen as the obvious answer to the plight of small schools, which could not attract specialized teachers, and could not offer sufficient course offerings. After enrollments peaked in 1970, consolidation was a mechanism for reducing the costs of schools that were expensive to operate because they were operating below capacity, which was seen as inefficient. More recently, consolidation has been suggested as a means of achieving more fiscal equity for school districts, and by extension, schools. Guthrie finds the evidence for economies of scale in larger schools and districts unpersuasive, and evidence of cost savings with larger size ambiguous, and the advantages for students uncertain.

By school year 1987-88, 35.6% of schools with 12th grade students had enrollments of 750 students or more, and more than fifty percent had enrollments of 500 or more students. Large schools had become so common that urban public schools enrolling 12th grade students were no more likely than suburban schools to enroll more than 750 students. Secondary schools were generally larger than elementary schools, in which over 60% have enrollments of 500 students or more (NCES, 1992: 98).

Based upon a nationally representative sample of schools and their staff conducted by the National Center for Education Statistics (NCES) in 1987-88, Bobbitt and others (1992) were able to estimate the characteristics of American public schools. They estimate that in the school year 1987-88, 39.9 million students attended 78,561 public schools. The public secondary school level component (excluding combined elementary/secondary schools) encompassed 19,314 schools enrolling 14.4 million secondary school students. If secondary public schools were identified by urbanicity (urban, suburban, rural), the vast majority (11,856, or 61.4%) could be described as rural-small city schools. Urban schools were the second most common (3,934 or 20.4%), and suburban the least frequent type (3,524 or 18.2%). The average size of public secondary schools in these categories was also estimated by Bobbitt et. al. Public urban high schools averaged 1,097 students, while suburban high schools averaged 1,027 students, and rural-small city high schools averaged 543 students. They also examined the frequency of schools above size 750. Over a quarter (26.9%) of all urban schools fall in the size category above 750 students, as do a quarter (25.8%) of all suburban schools, but only a tenth (10.1%) of all rural schools (Bobbitt, 1992: 12).

Bobbitt and others also found some evidence that supported Conant, but also evidence that supports more recent findings (discussed below) that curricula offerings quickly plateau with increased secondary school size.

> Schools in the largest size category (more than 750 students) were more likely than schools in any of the smaller size categories to offer remedial services ..., gifted and talented programs...,bilingual programs... or ESL programs. The smallest schools (fewer than 150 students) were much less likely than schools in any of the larger size categories to provide programs

> for handicapped students..., extended day or before- or after-school daycare programs..., free or reduced price lunches..., or ECIA Chapter 1 services. The relationship between school size and school programs and services was less definite in suburban and rural-small city schools (Bobbitt and others, 1992: 19-20).

Although school size may affect student affective and cognitive outcomes, one could argue that Conant (1967) had contended simply that high school size was related to curricular offerings, and that to attain adequate course offerings, high schools had to be of sufficient size. The first modern researcher to empirically investigate secondary school size and curriculum comprehensiveness was Monk (1987).

> Even if large schools take advantage of available scale economies, they may do so in a variety of ways. For example, large schools may differ from small schools only in terms of average class size and the number of sections offered of a given set of courses. Alternatively, large schools may attempt to take advantage of returns to specialization by offering additional courses that contribute to the breath and depth of the curriculum (Monk, 1987: 137).

Using New York State data on public school teachers, including detailed information about each of the individual teacher's assignments, Monk was able to construct each high school's course offerings, excluding any elementary grades and special education assignments. Using an unusual selection system, Monk chose school districts with 9-12 enrollments equal to 100, 200, 300, 400, 500, 1000, 1500, 2000, 2500, and 3000. The enrollment level was then changed by one student and the selection procedure was repeated until 10 groups of 10 school districts was chosen.

Monk theorized that curricular variation involved three dimensions in the mix of courses, and variation in the method of offering courses. The first he terms "breadth", or the number of subject areas that offer courses. The second dimension he terms "depth", or the number of sequential courses within a subject area, for example, Latin I, Latin II, Latin III. The third dimension Monk terms "completion", in which he considers the number of times a course is offered. In this regard "singletons" (only one course) are undesirable, because they force a student to choose between a lone course offering and competing courses offered simultaneously.

Monk found that "... the number of different courses continues to increase with enrollment throughout the range of school sizes...", rather than finding a plateau at a certain size (Monk, 1987: 139). Examining the breadth (the count of the number of subject areas covered) and depth (the average number of courses in a subject area), Monk found a ceiling on breadth at 1500 students in grade 9-12, or, in other words, that in school districts with enrollments above 1500, the average number of subject areas offered changes very little. Depth, on the other hand, increases with enrollment. In order to understand this phenomenon, Monk intensively examined English, foreign language, mathematics, and science course offerings and concluded that the difference in diversity of course offerings within a subject area for large and small high schools is not large. He also found that courses in large high schools are not always advanced and very specialized, but may instead be introductory in nature. Surprisingly, Monk found that only a small percentage of students in larger high schools enrolled in additional classes not available in small high schools.

Instead of finding different class sizes with different size high schools, Monk found

> ...that once a district enrolls 400 students in its top four grades, the average class size for full year core courses varies very little. This result suggest that whatever savings are associated with offering larger classes

> in larger schools are exhausted by the time enrollment reaches 400 students, a level that is considered small by New York standards (Monk, 1987: 143).

The results also indicated that where class sizes were small and the high school enrollment was small, teachers taught a larger number of classes. Administrators, however, seemed to have a strong aversion to classes with a small size, and school enrollments did not become very large before class sizes became what they are in larger high schools. Even more surprising, once the 400 student threshold is reached, teacher specialization within subject areas did not become more common.

In conclusion, Monk found that large high school size does not guarantee advanced course offerings, rather, larger high schools offered more introductory courses, much like the allegations of a shopping mall curriculum. In addition, few students took advantage of the additional courses offered in the large schools. Scheduling flexibility, as measured by singletons, suggested that schools above 400 gained little advantage. Above 400 students, increases in enrollment made little difference in improving students' access to courses, or in offering teachers the opportunity to teach more specialized classes, or by offering larger classes.

> ...There were numerous instances where larger schools offered as many or fewer courses as did considerably smaller schools. The message these data convey is that an expanded, more specialized, more diversified curriculum is not guaranteed by large enrollment levels alone. A second, and related message, is that it is possible to offer at the 400 pupil level a curriculum that compares quite favorably in terms of breadth and depth with curriculum offered in much larger settings (Monk, 1987: 148).

Haller and others (1990) also examined program comprehensiveness, using school-level and course-level files from the High School and Beyond (HSB) surveys conducted by the National Center for Education Statistics. Eliminating all private schools, all schools without grades 9-12, and all vocational or handicapped schools created a subsample of 481 high schools representative of 14,000 schools in the population. Haller and others created seven intervals of senior class size: (1) less than 25; (2) 25-49; (3) 50-99; (4) 100-199; (5) 200-299; (6) 300-399; and (7) 400 or more. This created a bias toward small schools, and clearly followed Monk's findings that little differentiation above 400 would be found. They coded three curricular areas for study: mathematics; the sciences; and foreign languages.

Examining science offerings, Haller and others found that base science courses are offered by the majority of schools regardless of size. Fewer than half of the smallest high schools (less than 100 in their senior class) offer advanced science courses. For mathematics, the norm for schools above size 400 was to offer a four-year math program and three year-long alternative math courses. Even very small high schools (less than 50 in their senior class) were able to match this large-school norm. The same size schools (less than 50) were able to offer two years of introductory study in a foreign language. By the time high schools reach at least 100 students in their senior class, they offer four full years of at least one language.

Oddly, Haller and others interprets these results in such a way as to argue that the programs of small high schools are less comprehensive than those of large high schools. They (correctly) conclude that at no particular size are programs in different curricular areas equally comprehensive. A small high school, for example, is able to offer a four year complement of basic, advanced and alternative courses in mathematics, basic (but not advanced) and beginning (but not advanced) foreign language offerings.

> Thus, at any given size level, comprehensiveness varies by subject. Further, as schools get larger, comprehensiveness increases differentially

both across and within subjects...(Haller and others, 1990: 116).

> Our analysis suggests that as schools get larger, they typically add advanced and alternative courses to their curricula. Relatively few schools lack the base course in a subject area, even among the very smallest. (Haller and others, 1990: 117).

One interesting argument raised by this research is the "rock poetry problem". Since Monk (1987) suggests that the advanced and alternative courses unique to large schools enroll a small minority of the students in a large school, the principal effect of school consolidation upon curricular offerings is to permit a few students to enroll in the advanced and alternative courses that the newly large school permits.

> This leads us to infer that the principal curricular effect of school consolidation efforts is to make it possible for a relatively small number of students to take advanced and alternative courses. Perhaps we are obtuse, but why the state should have an overriding interest in consolidating schools so that a few students are able to study calculus, physics, and a fourth year of German-to say nothing of rock poetry- eludes us (Haller and others, 1990:117-118).

Thus, the original argument advanced by Conant, for ever larger high schools in order to ensure curriculum comprehensiveness, seems to fail empirical examination. Almost half of the high school seniors in the nation are in a high school with an enrollment of less than 500 students (NCES, 1992). Monk's findings suggest that these schools (under 500 students) are sufficiently large, from the perspective of offering a comprehensive curriculum, and that the courses offered by larger schools only serve few students. Haller's work suggests that at no particular size is comprehensiveness in a subject area assured, and that even the smallest schools offer the basic course offerings.

That research does not support Conant's argument may be regarded as irrelevant, since the last thirty years has produced the consolidation and larger secondary school size that Conant sought. Vastly larger high schools are now the common experience of urban and suburban students who compose the majority of high school students in public education. Having discovered that there is no curricular benefit to largeness it becomes prudent to examine empirical studies of the claims of Barker and Gump that smallness is educationally beneficial.

Student Outcomes

Although student outcomes are normally divided into two realms, the affective and the cognitive, for our current exploration, it behooves us to separate student outcomes into four areas of interest: **student attitudes** (sense of obligation; satisfaction; persistence; loneliness; use of psychoactive substances); **student achievement** (test scores; constructive employment; college attendance); **voluntary participation** (extracurricular activities); **enduring effects** (in college; in young adulthood). Since the original findings of Barker and Gump did not revolve about student achievement, but rather student participation in school activities, student satisfaction with the school, number of classes taken, and community employment and participation in social organizations, most of the student outcome studies seek to replicate or explain those original findings. As larger and more sophisticated national data sets became available, researchers turned their attention to not only replication, but also examination of enduring effects.

A. Student Attitudes

Barker and Gump's (1964) original work suggesting the efficacy of small secondary schools was based upon only five schools, all extremes in size (four schools less than 151, one greater than 2,287). In addition, the statistical tests did not make use of multivariate analyses based upon large samples of the population. These findings were replicated by a number of researchers. The first such replication was by Willems (1967), in which data were obtained from 40 students in 1961 and 80 in 1965. Willems studied the same Kansas five high schools as Barker, and five others in the northeast Kansas area, four with less than 183 students, and one large school with 2,015 students. The 1961 study was primarily concerned with a student's sense of obligation, particularly for marginal students, and the 1965 study replicated the 1961 study and examined the depth of participation in nonclass activities.

Willems adopted Barker's theory that a ratio, S/A, can be quantified of the number of students (S), relative to the number of activities (A), and found that student attitudes are influenced by this ratio. When the S/A ratio is low, that is, many activities and few students, individual students experience "invitations, demands, exhortations, and requirements to participate" (Willems, 1967, p. 1249). Willems hypothesized that marginal students, that is, those perceived as relatively unsuited for school life, will receive less entrees, and will therefore feel less obligation to attend, assist, and participate in school activities. When the S/A ratio is low, maintenance of the school activity "will require the participation of persons who might otherwise be seen as unsuitable or marginal" (Willems, 1967, p. 1250). When the S/A ratio is high, that is, many students are available to participate in school activities, marginal students will not receive encouragement, will participate infrequently, and feel little obligation to participate. Barker (1964) reports that school size and S/A are highly correlated (.97), so that as school size increases, S/A also increases. Both samples yielded similar results, with students in small schools reporting higher senses of obligation than students in large schools. Willems reports an interaction, that is, most of the significant effects for school size were the result of marginal students. In small schools, marginal students reported a comparable sense of obligation as regular students, while in large schools they felt no such obligation. This effect persisted even when the reported sense of obligation was adjusted through analyses of covariance for the number of leadership positions held, which was thought to possibly distort the results. Willems concludes that the sense of obligation "is a personal disposition that mediates between pressures to participate and actual participation" (Willems, 1967: 1257).

Lindsay (1982) examined the effect of high school size on student satisfaction and student sense of belonging, replicating the work of Barker and Gump (1964) with a national sample of high school students. Using data from the National Longitudinal Study of the High School Class of 1972 (NLS), Lindsay examined the aptitude and attitude responses of 14,668 public high school seniors, a nationally representative sample. Schools were classified as small (senior class of less than 100, medium (101-400), or large (over 400). Student participation in athletics, journalism and student government was examined by

student self-report, as well as one category composed of drama, music, or debating. Students were also asked if they felt part of the school, and how satisfied they were with required courses. Principals were asked to report attendance rates. Three control variables were used: school location (rural or urban); socio-economic status (high and low); academic ability (high and low).

Confirming previous findings, Lindsay found student participation higher at small schools, particularly for females. Student satisfaction and attendance were also higher at smaller schools, and again, the differences were more pronounced for women. The effect of school size on satisfaction was weaker than for participation or attendance. High attendance rates, for example, were three to four times more likely to be found in small high schools than large high schools. Lindsay reports that school size and socio-economic status (SES) had independent effects, for example, participation rates for low-SES students at small schools are higher than for high-SES at large schools. SES seemed not to affect student satisfaction with required courses, nor, for female students when reporting if they "felt" they were part of the school. The feeling of low-SES males is the same, that is, they did not "feel" part of the school, no matter what the size of their school.

> Within the limits of this study, the data give empirical support to the argument that smaller high schools have some important advantages. Several of Barker and Gump's (1964) findings have been replicated on a national representative sample of students. School size affects student participation and satisfaction, independent of the effects of SES and academic ability (Lindsay, 1982:63).

The impact of high school size on dropout rate was investigated by Pittman and Haughwout (1987), using school data of the High School and Beyond (HSB) study from the National Center for Education Statistics. They employed a model testing the influence of school size on the diversity of academic offerings and on the school social climate, hypothesizing that school size was related to dropout rate primarily due to the effects of size on the school's environment.

The national sample used by Pittman and Haughwout is a longitudinal study of a national sample of students who were high school seniors or sophomores during spring 1980. Data were collected from a probability sample of 1,015 secondary schools, using random samples in each school of 36 seniors and 36 sophomores who completed achievement tests and questionnaires revolving about their school and student body. For this study, 744 public comprehensive schools were included. The researchers explored the relationship between dropout rate and school climate, program diversity, and size. The school climate measure consisted of the weighted sum of four components: general sense of cohesion; level of participation in school activities; interaction with faculty; and magnitude of problems at the school. This definition of school climate was derived from findings reported by Wehlage and Rutter (1986).

Pittman and Haughwout report that increasing the size of the student body corresponded to a similar rise in the school dropout rate. They suggest that school size mediates the level of student participation and the severity of school problems, with larger schools producing a poorer social climate, which, in turn, causes a higher dropout rate. They also found that diversity in programs and course offerings have, at best, a very small (beneficial) effect upon the dropout rate.

> One would estimate that for every 400-student increase in the high school student population, there would be approximately a 1% rise in the dropout rate at that school...The most direct implication of the findings is in the area of school consolidation. When small schools are consolidated into mega-schools, a sacrifice in the quality of school social environment is made (Pittman and Haughwout, 1987:343).

In a more recent study of school size and dropout rates, Fetler (1989) examined two consecutive years of dropout data for 789 California regular comprehensive public high schools. He sought to explore the relationships between dropout rate, the percentage of students that are covered by Aid to Families With Dependent Children (AFDC), total enrollment, academic course enrollments, and student achievement. About half of the variance in the dropout rate was accounted for by AFDC percentage, total enrollment, achievement, and academic course enrollment. Both AFDC and total enrollment were positively related to the dropout rate. High school achievement was associated with lower dropout rates, even controlling for AFDC and total enrollment. Academic course enrollment was not significantly related to dropout rate.

Page (1990), investigated high school size as a factor in adolescent loneliness, having discovered no studies on the subject in a literature review. Adolescents are at high risk for the occurrence of intense loneliness, particularly as a result of rejection by one's peers. Page accepts the definition of loneliness as "the absence or perceived absence of satisfying social relationships" (Page, 1990: 150). Page used student data from 1,297 ninth through twelfth grade students in twelve high schools in Idaho: four in excess of 1,000 students; four of 500-1,000; four with fewer than 500 students. The four small schools (less than 500) were located in communities with populations of less than 10,000, the medium sized schools (500-1,000 students) were located in cities of less than 20,000. Two of the large schools were located in metropolitan areas of 100,000, the other two in cites of 50,000 and 25,000. Students completed the Revised U.C.L.A. Loneliness Scale during health classes.

Those who attended medium-size schools (500-1,000) were significantly more lonely than those attending small and large schools. In addition, male students scored significantly higher on the loneliness scale. However, there was also an interaction effect for school size and gender.

> Students in small schools were the least likely to experience loneliness, and those in medium schools the most likely (for both males and females)...Females in large schools were much less likely to be lonely than the male counterparts in large schools as well as both male and female students from medium or small schools (Page, 1990: 152).

In the following year, Page (1991) explored adolescent use of alcohol, tobacco, and other psychoactive substances and its relationship to school size, using the same twelve high schools described above. Students completed a drug-use inventory asking how frequently they used the following substances: cocaine; marijuana or hashish; LSD, PCP, mescaline, or other hallucinogens; amphetamines; and sedatives. Similar questions were asked regarding alcohol and tobacco use. Five students who indicated use of a fictitious substance were eliminated for untruthfulness.

> Students in large schools were significantly more likely to drink alcohol, get drunk, use smokeless tobacco, and use marijuana or hashish than students in small and medium schools. Students in large schools were significantly more likely to smoke cigarettes than those in small schools (Page, 1991: 18).

Page suggests that these effects may not be the result of rural-urban differences, since the schools in his sample were all drawn from rural or semi-rural areas.

B. Student Achievement

Summers and Wolfe (1975) studied individual student data from 553 eighth-grade students in 42 schools, and 716 twelfth-grade seniors in five senior high schools in the city of Philadelphia. Although the junior high schools were a random selection, the senior high schools were not, and represented higher

levels of low income and black students. A two- to three- year history was compiled for each student, that was then matched with data on school characteristics, combined with Census tract data. The researchers explored the effects of such student characteristics as SES, sex, motivation, starting scores, residential moves, and native born status upon achievement, simultaneously with such school characteristics as class size, school size, teacher experience, college rating, school physical facilities, and school climate.

> Smaller schools are effective in increasing learning in elementary and senior high schools. Black elementary school students particularly benefit from being in smaller schools, and low achievers particularly benefit in senior high schools (Summers and Wolfe, 1975: 11).

Coleman, Hoffer and Kilgore (1982), compared a subsample of twelve high performance public high schools with eleven high-performance private schools, as well as a national sample of 894 public schools and 6,000 private schools from the High School and Beyond Study (HSB) of the National Center for Education Statistics. They found size differences between public and private schools caused the smaller sized private schools to offer a narrower range of courses than public schools, and to have fewer special programs and physical facilities. They also found that the high performance public schools offer advanced courses on an already comprehensive set of course offerings, compared to their private school counterparts.

> When we turn to size of school itself,... we find that, when family background and grade in school are controlled, ...the relation of school size to achievement is positive, while the relation of absenteeism, lateness, and cutting classes to achievement is negative, but the latter are positively related to size. At least, this is the case in the public schools (Coleman, Hoffer, and Kilgore, 1982: 163).

Fowler and Walberg (1991) investigated school size effects for 293 public secondary schools in New Jersey, using 18 school outcomes, including average scores on state-developed tests, student retention, suspensions, postschool employment, and college attendance. The 18 school outcomes included district socioeconomic status and percentages of students from low-income families; school size and the number of schools within each district; and teacher characteristics encompassing salaries, degree status, and years of experience. District socioeconomic status and the percentage of students from low-income families in the school were the most influential and consistent factors related to schooling outcomes.

> School size and number of schools in the district were the next most consistent variables. Ten of the outcomes were negatively associated with the number of schools in the district. Six of the outcomes were negatively associated with school size, and retentions and several of the achievement test scores were higher in smaller schools (Fowler and Walberg, 1991: 199).

Using only rural public schools from the High School and Beyond (HSB) data set, Marion, McIntire, and Walberg (1991) examined the effects of per-pupil expenditures, school size, and student characteristics on student achievement and educational attainment. Using 251 rural schools, they estimated school size by averaging grade 10 and grade 12 enrollments, and multiplying by 4 to obtain an estimated high school enrollment. They then aggregated socioeconomic status, educational attainment, achievement, verbal ability, and educational aspirations to school-level variables. They found that school size was negatively correlated with school-level achievement and educational attainment, controlling for the socioeconomic status of students.

C. Student Voluntary Participation

Baird (1969), reports the results of two studies regarding school size, one examining high school size and nonacademic achievement and the other the persistent effects on nonacademic accomplishment in college. Baird was concerned that Barker and Gump's research was confined to only five high schools in Kansas, that their definition of "participation" was too inclusive, and that the level of participation was too low to be educationally relevant. He also was concerned that Willems (1967) had measured the effects of community urbanization, rather than simply school size. Baird obtained data from a 3% sample (approximately 21,371 students) of the college applicants who took the ACT assessment. The American College Testing Program (ACT) included tests of academic aptitude in English, mathematics, social studies, and natural science, and reports of high school grades in each of these four subject areas and a composite score. The student profile section of the ACT included questions about nonacademic accomplishments in leadership, music, drama, art, writing, and science. The profile also included questions requiring the respondent to classify their school by the size of their graduating class into four groups: (a) less than 25, (b) 25-99, (c) 100-399 and (d) more than 400. Plans for extracurricular participation in college were also requested.

The analyses were carried out for each of the six nonacademic accomplishments (leadership, music, drama, art, writing, and science), for the total number of nonacademic accomplishments, for high school grade point averages in a five-point scale (in English, mathematics, social studies, and natural science). Baird found that high school size was related to non-academic achievement in four of six accomplishments studied (leadership, music, drama, writing, but not art or science). Remarkably, the number of students who had **no** nonacademic accomplishments was higher in large schools.

> If low participation is defined by a score of three (accomplishments) or less, it is seen that 31.5% of students from the largest schools have low participation, while only 11.6% of the students from the smallest schools have low participation (Baird, 1969, p. 255).

Morgan and Alwin, (1980) also found that "increases in school size lead to decreased student participation (p. 249)". They used a simple random sample of 30 high schools from a sampling frame of 224 rural (located in a town of less than 10,000) schools in the state of Washington. These schools ranged in size from 17 to 236 (juniors and seniors). In the following year, a second sample of 25 high schools, stratified by size and vocational course offerings, was obtained from a sampling frame of all public schools in the state. The second sample consisted of 12 high schools, ranging in size from 37 to 910 (juniors and seniors). Student respondents were weighted because of the over-representation of small rural schools.

Morgan and Alwin set out to understand if the rate of participation decline with larger size is present for all types of extracurricular activities, and of a constant rate over ranges of school size. They examined the number of positions or <u>slots</u> filled by students in a given school, using a linear structural equation at the school level, with school size as an independent variable, and the number of slots as the dependent variable. They also modified the equation to examine the slope, and used quadratic and logarithmic equations. Extracurricular activities measured were: athletics, music, dramatics, debate, school paper, student government, FFA or FHA, hobby clubs, and other. They found that the direction and magnitude of the school size effect varies with the nature of the activity. Activities which were central to the functioning of the school, but inelastic (that is, there are only so many journalism positions) show the strongest effects, while hobby clubs show the reverse, that is, increased rates of participation with increases in school size. Students from smaller high schools were not only more likely to be engaged in a greater number of activities, they were also more likely to be involved in each activity.

While instructional activities in schools are undoubtedly more central than

> all extracurricular activities, a school with a small number of available participants is likely to define some extracurricular activities as more expendable than others. Thus, Coleman (1965) and others have observed that high school athletics are of central importance, not just to students, but to parents and school personnel as well (Morgan and Alwin, 1980: 249).

Lindsay (1984) wished to explore patterns of student participation in high school extracurricular activities and how those patterns affect social participation in young adulthood. Lindsay goes beyond the inclusion of the three individual background characteristics normally included in studies of school size effects -- socioeconomic status (SES) of the student's family, academic ability, and gender -- and includes sociability, that is, the individual's predisposition to participate in voluntary activities. He also includes community size and curriculum track and high school grades as control variables, using data from the National Longitudinal Study of the High School Class of 1972, which is a nationally representative sample of seniors in public and private high schools in the 50 states and D.C. The sample is a stratified two-stage probability sample with schools as first-stage sampling units and students (18 from each school, selected randomly from the senior class) as second-stage units. The strata are geographic regions, urbanization income levels, school size, public or private, and ethnic background. The respondents were surveyed again in 1973, 1974, 1976, and 1979. In this way, data were collected initially from 16,682 students representing 1,070 schools in the base year. Excluding missing data and full-time students yielded a sample of 8,952 high school students. Voluntary participation in nine types of senior year activities (athletics, cheerleading, debating-drama-music, hobby clubs, honorary clubs, school journalism, school subject clubs, student government, mean score) were examined against background variables.

> The results also replicate earlier findings that students at smaller schools are more likely to participate in extracurricular activities. This organizational effect is stronger than those of individual background variables (SES, academic ability, gender, sociability) as well as curriculum track and class rank (Lindsay, 1984: 79).

Concerned that all of the usual measures of student participation were based upon student self reports, Schoggen and Schoggen (1988) tabulated the names printed near photographs of activity groups published in school yearbooks for 10,412 seniors in 27 public high schools in central New York state. The high schools ranged in size from 21 to 622 students in the senior class. Urban schools were excluded because they were thought to have unique characteristics. Participation was the mean number of participations, i.e., different activities, per student per year, and the percentage of students with different numbers of participations. The diversity of participation was measured by the mean number of different genotypes in which each senior participated. A genotype is a grouping of similar kinds of activities, e.g. football, basketball, baseball. Other variables included in the study were a proxy for socioeconomic status (per-pupil operating expenditures by the school district); distance between home and school, which was thought to influence participation in after school activities; the number of different school activities pictured in each yearbook. The New York data were added to earlier work on schools located mainly in the Midwest and far West, in case some regional difference might appear.

Schoggen and Schoggen found that larger schools offered many and more varied activities than did small schools, but that a high percentage of students in large schools do not participate in any of the schools extracurricular activities. The five largest high schools, for example, offered students an average of 90 activities, while the five smallest high schools offered an average of 20 activities pictured in the yearbook. They also found that size of school was highly positively correlated with school drop-out rate. The surrogate measures for socio-economic status and distance between home and school did not contribute significantly to student participation, once school size was controlled.

> Students in smaller high schools on the average participate in the extracurricular activities of their schools at a higher rate than do their counterparts in larger high schools. Especially noteworthy and robust is the higher percentage of students in the larger schools who, relative to those in the smaller schools, show no participations in any of the school's activities (Schoggen and Schoggen, 1988: 292).

In an extensive literature review of available empirical findings on extracurricular activities, Holland and Andre (1987) examine five area of attainment: personal-social characteristics, academic achievement, educational aspirations and accomplishments; participants' roles in activities, and environmental social context. They found that higher levels of participation brought about higher levels of student self-esteem, greater feelings of control of one's life, higher educational aspirations and attainment, improved race relations, higher grades (in males), lower delinquency rates, and more political and social involvement in young adulthood. Small schools bring about more student participation in a greater number and variety of extracurricular activities, especially for low-ability and low socioeconomic status students.

D. Enduring Effects

Baird (1969) (in a study described above) used a follow-up of the American College Survey to obtain data for 5,123 students attending 29 colleges. The follow-up was administered to these students at the end of their sophomore year. Baird examined the enduring effects of high school size by comparing students from different size high schools on nonacademic college achievement. Baird found no significant difference between the rate of college extracurricular participation, based upon the size of the high school the student attended. Baird notes that high school nonacademic achievement and college extracurricular participation are highly related, but that the advantage that small high school students enjoy does not transfer to the college years. Interestingly, college participation was related to college size, at least among the 29 colleges in Baird's sample.

The persistent effects of school size on 400 randomly selected freshman was studied by Downey (1978). He examined student participation in college, and found that, in general, the number of activities a freshman participated in college and the size of the high school he attended were related. Students from small schools participated more, and accomplished more, particularly in leadership, music and speech, with moderate attainment in writing and athletics.

Relationships between high school characteristics, including size and college freshman achievement were examined by Huba, (1983). She found that 3141 freshman attending a large midwestern public university did not differ in terms of grade-point averages or persistence in college, regardless of their school district's characteristics, including size of graduating class.

Lindsay (1984) also conducted a two part study, of which the first is described above. Lindsay was not only interested in high school size effects on student participation in extracurricular activities, but also on the school size effects on social participation in college. Lindsay confirmed his central hypothesis, that greater participation in high school extracurricular activities endures as higher participation as a young adult in voluntary social activities. This effect is larger and more powerful than educational attainment, which also is highly correlated with adult voluntary participation.

> Students who participate in extracurricular activities during high school are more likely to participate in a broad range of social activities as young adults, controlling for other known influences....Similarly, it may be noted that high school activity participation is determined more by high school size than by each of the other variables in the model: family SES,

academic ability, gender, sociability, curriculum track, and rank in class (Lindsay, 1984: 81).

Berk and Goebel (1987) explored the continuing effects of high school size upon the voluntary participation of 283 unmarried seniors at a single large state university. The results confirmed that students in smaller high schools exhibited higher extracurricular participation. Berk and Goebel found, however, that the degree of participation in high school was a better predictor of college participation than was high school size. Students from smaller schools who participated more in high school did not persist with higher levels of participation in college extracurricular activities.

Conclusions

This review sought to examine empirical studies of the conflicting claims for the proper size of public secondary schools in the United States. Some thirty years ago, with scant research evidence, one proponent argued for high schools with a minimum size of 100 students in the senior class in order to achieve curricular adequacy. Almost simultaneously, other researchers extolled the affective virtues of small high schools. Regardless of the merits of the arguments, it is now apparent that the most common experience for the majority of high school students in the nation is to be educated in a high school with an enrollment that exceeds 500 students (NCES, 1992). The reasons for the success of the consolidation movement are beyond the scope of this paper, which only explores the effects of the large secondary schools produced by school consolidation upon student outcomes.

Perhaps most surprising were the empirical findings of Monk and Haller that curricular adequacy was reached at a school size level that we now consider a small high school, that is, with a graduating class of 100 students. Beyond this level, advanced and alternative courses attract only small segments of the student body. Monk and Haller simply found that size alone does not guarantee a comprehensive curriculum in any subject area, and that the breadth and depth of the curriculum of these small schools compares very favorably with larger schools. Simply put, there is no empirical evidence to support Conant's thesis.

One can, however, aver that Conant never intended to argue anything other than that larger high schools are desirable so that they may offer a truly comprehensive curriculum. Those who make this argument must be terribly disappointed by the findings that although the number of different courses continues to increase with enrollment, that the breadth of course offerings (count of the number of subject areas covered) plateaus quickly, and that many of the additional course offerings by larger schools were introductory in nature. Even the size of classes taught by teachers seemed to average the same with large high schools, once the magic level of 400 students for four grades was reached. Once a high school reached this very small size in an urbanized state, the breadth and depth of its curriculum compared propitiously with larger high schools.

In addition, as high schools become larger, they seem to add advanced and alternative courses to their offerings. Basic courses prevail even among the smallest high schools (that is, under 50 in a graduating class), so that at least a year or two of foreign languages (for example) are offered. What is problematic is that attendance in these advanced and alternative courses is selected by so few students in the large high schools.

These revelations regarding curricular offerings of large high schools are cogently raised by asking whether it is wise public policy to offer "rock poetry" in large, comprehensive high schools, which, it can be shown, have myriad detrimental effects upon student affective and cognitive outcomes.

But what do we make of our current situation, with large secondary schools being the norm for most

of the public school student population. Large secondary schools, that is, those with a graduating class above 750 (over 35% of the public school enrollment), seem to have untoward effects upon student attitudes, achievement, and voluntary participation. Such consistent findings among such a broad array of secondary student outcomes is troubling enough, but some researchers also suggest that these effects may persist into adulthood, if not into college attainment.

Sufficient theoretical work has been done to suggest how the mechanism of school size affects student outcomes. Secondary school size determines student satisfaction with academic courses, attendance, and participation in extracurricular activities. Student achievement is enhanced by satisfaction with academic courses, with a low dropout rate, and through voluntary participation in extracurricular areas, all of which are highly correlated with small secondary schools. Perhaps key to the small secondary school size effect is the notion of "manning". "Manning" is when few students are available for many activities, the student who would be marginal in other, larger, environments receives entree to participate. In so doing, the marginal student becomes more like his desirable counterparts. From the psychological aspect, the student's sense of loneliness declines, his concern for persons is enhanced, and his sense of community, that is, a common goal, is heightened, and deviant behavior, such as use of psychoactive drugs, declines. From a sociological perspective, activities that are inelastic, but central to the functioning of the school, such as journalism, demonstrate the strongest effects of school size. Some studies found these organizational effects stronger than individual background variables, such as socioeconomic status, academic ability, gender, or sociability.

Some reviewers doubt that available studies satisfactorily demonstrate that increased participation in extracurricular activities produces successful student outcomes, and that small school size enhances participation (Holland and Andre, 1987). These doubting reviewers must rely upon two weak assertions: that student self-selection is producing the effects found; some unknown moderator variable exists through which these positive changes in student outcomes are wrought.

> In saying that participation may influence adolescent development positively, we are not saying that we believe that participation, per se, influences development....participation may lead adolescents to acquire new skills,...to develop or strengthen particular attitudes..., or to receive social rewards that influence personality characteristics... But the available literature also fails to substantially demonstrate a causal sequence between participation, process variables, and desirable outcome variables (Holland and Andre, 1987: 447-448).

Neither contention seems plausible. If student self-selection is involved, it permeates all the student's outcomes, persisting into young adulthood, and acting as a desirable and enduring effect of education. This is particularly true if the student is "marginal" or of low socioeconomic status, and has been given the self belief and self esteem to participate, when normally they would not. That the causal mechanism is unknown is less relevant than the confirmation of the beneficial effect.

Perhaps one area where the research results are not in such overwhelming agreement is whether or not the secondary school size effects persist into college attendance. That patterns of voluntary participation extend into adulthood seems resolved, in that greater participation in high school leads to more voluntary social activities as a young adult. However, participation in college extracurricular activities seems to depend more upon the size of the university than upon the size of the high school class that a student was a member of some years ago. University participation, similar to high school participation in extracurricular activities is influenced by the size of the university, that is, the smaller the organization, the higher the level of involvement.

Student achievement also was, on average, higher in smaller high schools. This finding appears

to be particularly true of poorly achieving students (perhaps, in much the same way as "marginal" students in small high schools participate more). However, the finding that student achievement is enhanced by small high school size was supported by the fewest studies, and so must be considered less robust than the findings for student attitudes, attendance, participation and satisfaction. In addition, it was the one area where contradictory findings occurred. Coleman and others found that student achievement was higher in larger schools, but was moderated by the adverse behavioral effects of large schools.

We have in secondary education a paradox. The overwhelming weight of research studies confirm beneficial effects for small high school size, and detrimental effects for large high school size. However, for over thirty years, educators have been pursuing a policy of high school consolidation, which has lifted the average size of high schools well beyond that urged by the strongest advocates of larger secondary schools, and present policies suggest that the trend toward ever larger high schools will continue. Indeed, one consequence of the desire for fiscal equity has been to suggest that the states of both Texas and New Jersey consolidate their existing schools, in order to facilitate their efforts toward equitable financing of their public school systems. Even in the absence of state supreme court mandates and encouraging legislation, there are bureaucratic and personal rewards for vastness: larger budgets; more staff to supervise; higher salaries; greater prestige; larger communities in which to reside; more powerful sports teams with a winning record. In short, there is a natural predilection in American education toward enormity, and it does not serve schools well.

How should this paradox be addressed? First, replicative studies should abound, particularly those that extend existing research, and examine some causal sequence between school size, student participation, process variables, and desirable outcomes. Second, there must be a dissemination mechanism that educates policy makers regarding the known desirable attributes of small schools. Third, the existing evidence is sufficient to suggest that educators consider making schools smaller than they currently are. In the meantime, it may be useful to remember that it took the better part of half a century to make schools larger. If the next half century devotes itself to making schools smaller, the existing evidence suggests it will be a effort well spent.

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Note

This article is intended to promote the exchange of ideas among researchers and policymakers. The views are those of the author, and no official support by the U.S. Department of Education is intended or should be inferred.

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